

Final Report

Strategic Environmental Research and Development Program (SERDP)

prepared by

National Supercomputing Center for
Energy and the Environment (NSCEE)



for

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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
<p>Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</p>			
1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED	
	2/12/98	Final 12/92 - 1/97	
4. TITLE AND SUBTITLE		5. FUNDING NUMBERS	
Strategic Environmental Research and Development Program/Public Law 101-510		Grant #CA-N000014-92-2-2001	
6. AUTHOR(S)			
Joseph Lombardo, Director NSCEE			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)		8. PERFORMING ORGANIZATION REPORT NUMBER	
See Attached Project Report			
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES			
Final Report			
12. DISTRIBUTION / AVAILABILITY STATEMENT		13. DISTRIBUTION CODE	
14. ABSTRACT (Maximum 200 words)			
<p>The purposes of the (SERDP) program are as follows:</p> <ol style="list-style-type: none"> 1. To address environmental matters of concern to the Department of Defense and the Department of Energy through support for basic and applied research and development of technologies that can enhance the capabilities of the departments to meet their environmental obligations. 2. To identify research, technologies, and other information developed by the Department of Energy for national defense purposes that would be useful to governmental and private organizations involved in the development of energy technologies and of technologies to address environmental restoration, waste minimization, hazardous waste substitution, and other environmental concerns, and to share such research, technologies with such governmental and private organizations. 3. To furnish other governmental organizations and private organizations with continued 			
15. SUBJECT TERMS		16. NUMBER OF PAGES	
Environmental Research, Energy Technologies, Climate Modeling, Atmospheric Modeling			
17. SECURITY CLASSIFICATION OF REPORT		18. SECURITY CLASSIFICATION OF THIS PAGE	
Unclassified		19. SECURITY CLASSIFICATION OF ABSTRACT	
		20. LIMITATION OF ABSTRACT	

REPORT DOCUMENTATION PAGE 2

data, enhanced data collection capabilities, and enhanced analytical capabilities for use by such organizations in the conduct of environmental research, including research concerning global environmental change.

4. To identify technologies developed by the private sector that are useful for Department of Defense and Department of Energy defense activities concerning environmental restoration, hazardous and solid waste minimization and prevention, hazardous material substitution, and provide for the use of such technologies in the conduct of such activities.

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SERDP Proposals Funded

Proposal Number	PI Name(s)	Institution	Title	Awarded SBUs	Awarded Duration
Phase I Awards					
92-01	Robert L. Lee and Jinwon Kim	Lawrence Livermore National Laboratory	Climatology of Gravity Wave Forcing on the Atmospheric Motion	350	2
92-04	Jeffery Lienau	University of California, Davis	Numerical Simulation of Particle Dispersion in Round Turbulent Jets	250	1
92-05	R. V. Madala	Naval Research Laboratory	High Resolution Regional and Mesoscale Model	500	2
92-06	Rose C. McCallen	Lawrence Livermore National Laboratory	Large Eddy Simulation of Turbulent Flow Around Buildings Using the Finite Element Method	700	2
92-07	J. Alan Ross	Lawrence Livermore National Laboratory	An Algebraic Stress Model for Turbulent Flow Using the Finite Element Method	200	2
92-11	Joseph P. Pinto	Environmental Protection Agency	Photochemical Modeling Studies Related to Global Change	250	2
92-12	Joyce E. Penner	Lawrence Livermore National Laboratory	Climate Studies of the Direct and Indirect Effects of Sulfate Aerosols	1700	2
Total				3950	
Phase II Awards					
93-1	Liang Xu	North Carolina State University	Mesoscale Processes IMportant for Understanding Global Climate	1000	2
93-2	Martin J. Leach	North Carolina State University	Physical Processes Important for Understanding the Hydrologic Cycle	400	2
93-3	Richard M. Hodur	Naval Research Laboratory	Development of a Coupled Ocean/Atmospheric Model to Determine Environmental Conditions for US Navy Operations	500	2
93-4	James D. Doyle	Naval Research Laboratory	Air-Sea Interaction during Explosive Cyclogenesis	600	2
93-5	Jeffery Lienau	University of California, Davis	Numerical Simulation of Round Turbulent Jets	250	1
93-6	John W. Glendening	Naval Research Laboratory	Large-Eddy Simulation of Vertical Transport by Coherent Roll Structures in the Atmospheric Boundary Layer	800	2
93-8	Gail P. Anderson	Hanscom AFB	SAMME Global Sensitivity Studies	500	1
Total				4050	

Proposal Number	PI Name(s)	Institution	Title	Awarded SBUs	Duration (years)
93-16	Robert E. Dickinson	University of Arizona	Development of the State of the Art Interactive Land Model for Greenhouse Projections	2500	2
93-17	Wei-Chyung Wang	University of New York at Albany	Model Assessment of the Enhanced Greenhouse Effect, Phase 2	2250 ^a	2
93-18	Julio T. Bacmeister & Simon Chang	Naval Research Laboratory	A Proposal to Examine Mountain Wave Generation over Complex Terrain	500	1
93-20	Robert L. Lee John C. Pace Jinwon Kim Su-Tzai Soong	Lawrence Livermore National Laboratory	Modeling Regional Scale Climate Change	500	1
93-21	Jeffery Lienau	University of California, Davis	Numerical Simulation of Round Turbulent Jets	250	1
93-22	Suman Rao	North Carolina State University	Effect of Land Use Patterns on Regional Climate	250	1
93-23	Kiran Alapati	North Carolina State University	Sensitivity of Monsoon Rainfall Predictions to Cumulus Parameterization Schemes: Implications for Climate Modeling	250	1
93-25	J. Alan Ross	Lawrence Livermore National Laboratory	Modelling Turbulent Flow Around Building Using the Finite Element Method with an Algebraic Stress Model	250	1
93-27	Melani Wetzel Gary T. Bates	Desert Research Institute National Center for Atmospheric Research	Regional Climate Modeling with Satellite Derived Initialization and Validation	240	2
93-28	Martin J. Leach	North Carolina State University	Physical Processes Important for Understanding the Hydrologic Cyclone	600	1
93-29	Lawrence A. Mysak	McGill University	International Variability of Arctic Sea Ice	700	1
Total				6040	

a. Unfunded Account.

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NAVAL RESEARCH LABORATORY
FINAL USAGE REPORT

GRANT # CA-N00001492-2-2001

January 7, 1993 - September 27, 1997

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Introduction

Public Law 101-510 established the Strategic Environmental Research and Development Program (SERDP) in Fiscal Year 1990. The Naval Research Laboratory (NRL) and the National Supercomputing Center for Energy and the Environment (NSCEE) signed a three-year cooperative agreement in September 1992 to provide supercomputing support to the SERDP program.

This cooperative program supports research and development projects in atmospheric modelling and analysis in support of global environmental change which has been identified as a key component of the SERDP.

"The purposes of the (SERDP) program are as follows:

1. To address environmental matters of concern to the Department of Defense and the Department of Energy through support for basic and applied research and development of technologies that can enhance the capabilities of the departments to meet their environmental obligations.
2. To identify research, technologies, and other information developed by the Department of Defense and the Department of Energy for national defense purposes that would be useful to governmental and private organizations involved in the development of energy technologies and of technologies to address environmental restoration, waste minimization, hazardous waste substitution, and other environmental concerns, and to share such research, technologies, and other information with such governmental and private organizations.
3. To furnish other governmental organizations and private organizations with data, enhanced data collection capabilities, and enhanced analytical capabilities for use by such organizations in the conduct of environmental research, including research concerning global environmental change.
4. To identify technologies developed by the private sector that are useful for Department of Defense and Department of Energy defense activities concerning environmental restoration, hazardous and solid waste minimization and prevention, hazardous material substitution, and provide for the use of such technologies in the conduct of such activities."

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Objectives

The objectives of this program are to:

- Provide a numerical laboratory for SERDP related research projects.
- Support advancement of modelling capability and understanding of climate change and predict potential human impacts on climate for the future.
- Support modelling experiments to quantify uncertainties associated with predicting climate change caused by human impacts on the environment.

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Computing Resource Requirements Questionnaire

Please specify your project requirements.

PI Name: _____

Project Title: _____

Affiliation: _____

E-mail address: _____

Resource Required	Quantity/ Method
Cray YMP CPU hours	
Cray YMP physical memory requirements (megabytes)	
Cray YMP SSD (megabytes)	
Cray YMP temporary disk storage during job execution (megabytes)	
Permanent disk storage requirements	
On-line storage (data migration to tape) in megabytes	
Printed output (pages)	
Magnetic tape transmittals	
Mode of communication (modem or Internet network)	
Please list any software you may need for your project (e.g., IMSL, FIDAP, GAUSSIAN)	

Proposal Guidelines

Proposals should delineate the modelling activity, numerical experiment and/or analysis concept and its relation to the SERDP. A schedule of work and Cray YMP time requested must be provided. Specific details of how modelling or analysis activity relates to SERDP goals must be provided in the proposal. Proposals may only request computing time and resources. Proposals may be submitted for a duration of up to 2 years.

Proposals will be reviewed on a quarterly basis by a technical review committee. The deadline for submission of the first round of proposals is November 30, 1992. Computing resources will be allocated on a first-come first-serve basis.

Submit eight (8) copies of proposals (not to exceed five (5) pages in length) and copy of the enclosed computing resources questionnaire to:

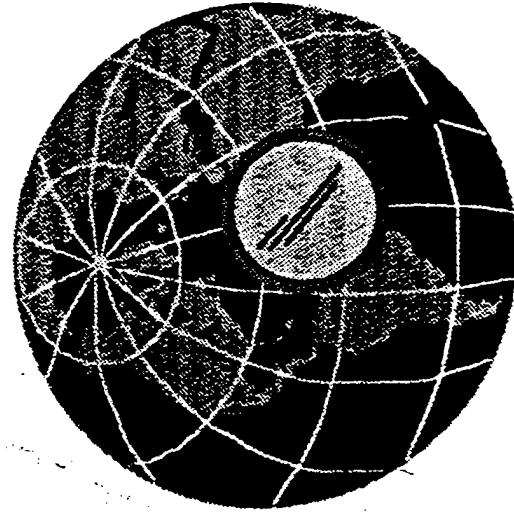
National Supercomputing Center for
Energy and the Environment
University of Nevada, Las Vegas
4505 Maryland Parkway
Las Vegas, Nevada 89154-4028

Ph: (702) 895-4153
Fax: (702) 895-4156
e-mail on Internet: bn@nye.nscce.edu

Strategic Environmental Research and Development Program (SERDP) Supercomputing Support

Program Announcement
and Request for Proposals
sponsored by

The National Supercomputing
Center for Energy and the
Environment
and
The Naval Research Laboratory



Introduction

The National Supercomputing Center for Energy and the Environment (NSCEE) is soliciting proposals in support of the Strategic Research and Development Program (SERDP). Public Law 101-510 established the Strategic Environmental Research Program in Fiscal Year 1990. The Naval Research Laboratory (NRL) and the NSCEE signed a three-year cooperative agreement in September 1992 to provide supercomputing support to the SERDP program.

This program supports the research and development program in atmospheric modelling and analysis in support of global environmental change which has been identified as a key component of the SERDP.

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(3) To furnish other governmental organizations

and private organizations with data, enhanced data collection capabilities, and enhanced analytical capabilities for use by such organizations in the conduct of environmental research, including research concerning global environmental change.

(4) To identify technologies developed by the private sector that are useful for Department of Defense and Department of Energy defense activities concerning environmental restoration, hazardous and solid waste minimization and prevention, hazardous material substitution, and provide for the use of such technologies in the conduct of such activities."

Objectives

The objectives of this program are to:

- Provide a numerical laboratory for SERDP related research projects.
- Support advancement of modelling capability and understanding of climate change and predict potential human impacts on climate for the future.
- Support modelling experiments to quantify uncertainties associated with predicting climate change caused by human impacts on the environment.

Proposal Evaluation Criteria

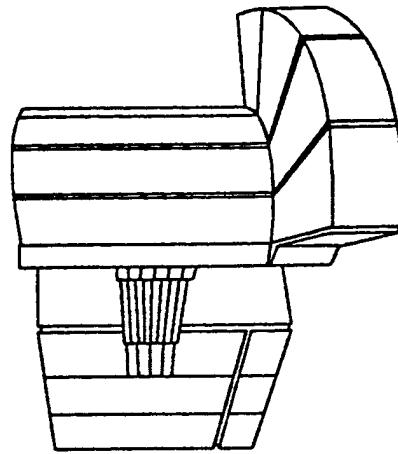
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Numerical Laboratory

The NSCEE computing resources include a Cray YMP-2/216 with 16 million 64-bit words of central memory (128 megabytes), two processors, and an integrated Solid-state Storage Device (SSD) that contains 32 million 64-bit words (256 megabytes) of fast access memory. The Cray YMP-2/216 is capable of performing over 600 million 64-bit floating point operations per second. The Cray disk storage units have a total capacity of 24 gigabytes. Data migration is performed transparent to users for tape storage of aged files. NSCEE also operates a Convex C-220 and a Sun-MP690. All systems operate under the Unix operating system.

A full range of support services are available to NSCEE users. These services include assistance in troubleshooting computer problems, information on techniques to speed up computer model runs, and supercomputing training classes and documentation.



- Support modelling experiments to quantify uncertainties associated with predicting climate change caused by human impacts on the environment.

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PI-Name: _____

Project Title: _____

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Printed output (pages)	
Magnetic tape transmittals	
Mode of communication (modem or Internet network)	

Please list any software you may need for your
project (e.g., IMSL, FIDAP, GAUSSIAN)

Proposal Guidelines

Proposed modelling activity, numerical experiment and/or analysis concept and its relation to the SERDP. A schedule of work and Cray YMP time requested must be provided. Specific details of how modelling or analysis activity relates to SERDP goals must be provided in the proposal. Proposals may only request computing time and resources. Proposals may be submitted for a duration of up to 2 years.

The deadline for submission of the second round of proposals is April 5, 1993. Computing resources will be allocated on a first-come first-serve basis.

Submit seven (7) copies of proposals [not to exceed ten (10) pages in length], 2-page curriculum vitae, and copy of the enclosed computing resources questionnaire to:

National Supercomputing Center for
Energy and the Environment
University of Nevada, Las Vegas
4505 Maryland Parkway
Las Vegas, Nevada 89154-4028

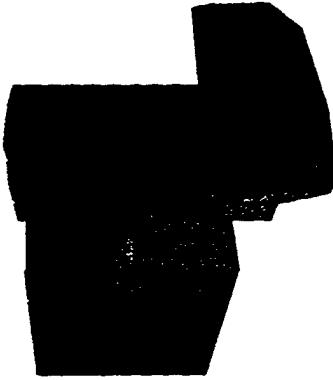
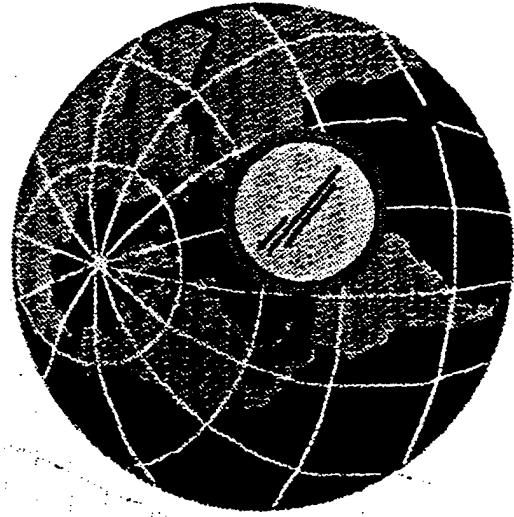
Ph: (702) 895-4153
Fax: (702) 895-4156
e-mail on Internet: bn@nye.unsce.edu

Strategic Environmental Research and Development Program (SERDP) Supercomputing Support

Phase II Program Announcement and Request for Proposals

sponsored by

**The National Supercomputing
Center for Energy and the
Environment**
and
The Naval Research Laboratory



Introduction

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Proposal Evaluation Criteria

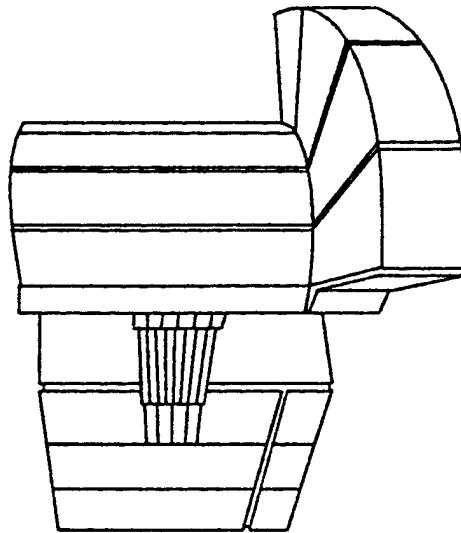
The proposals will be evaluated by a technical review committee based on the following criteria:

- Scientific merit (30%).
- Qualifications of PI and institution (30%).
- Relevance to SERDP goals (30%).
- Cost/benefit (10%).

Numerical Laboratory

The NSCEE computing resources include a Cray YMP-2/216 with 16 million 64-bit words of central memory (128 megabytes), two processors, and an Integrated Solid-state Storage Device (SSD) that contains 32 million 64-bit words (256 megabytes) of fast access memory. The Cray YMP-2/216 is capable of performing over 600 million 64-bit floating point operations per second. The Cray disk storage units have a total capacity of 24 gigabytes. Data migration is performed transparent to users for tape storage of aged files. NSCEE also operates a Convex C-220 and a Sun-MP690. All systems operate under the Unix operating system.

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The deadline for submission of the proposals is August 13, 1993. Computing resources will be allocated on a first-come first-serve basis.

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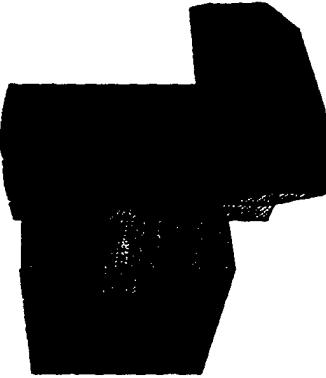
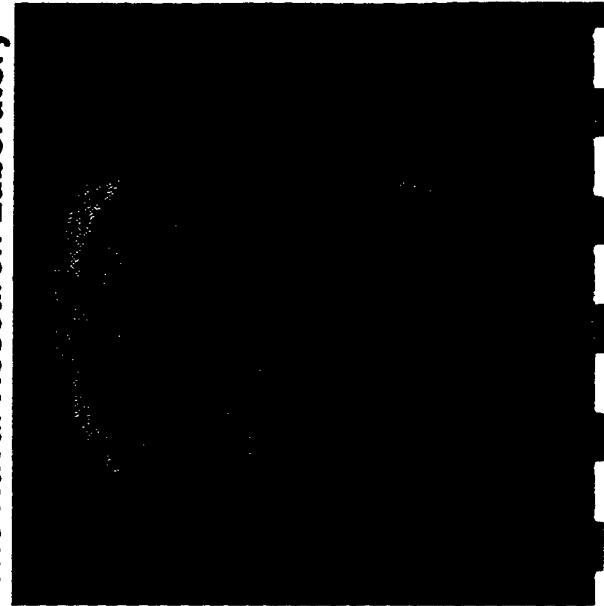
Ph: (702) 895-4153
Fax: (702) 895-4156
e-mail on Internet: bn@nye.unsce.edu

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Phase III Program Announcement and Request for Proposals

sponsored by

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and
The Naval Research Laboratory



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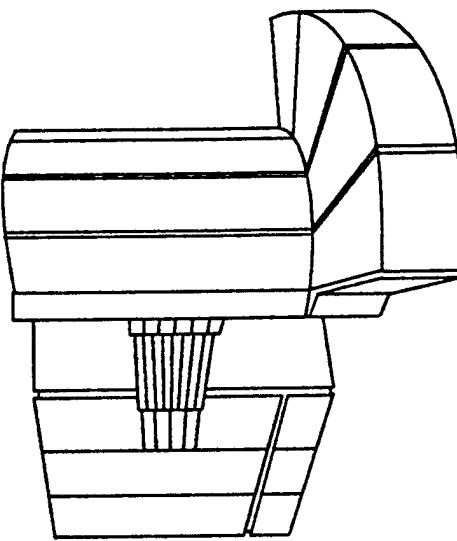
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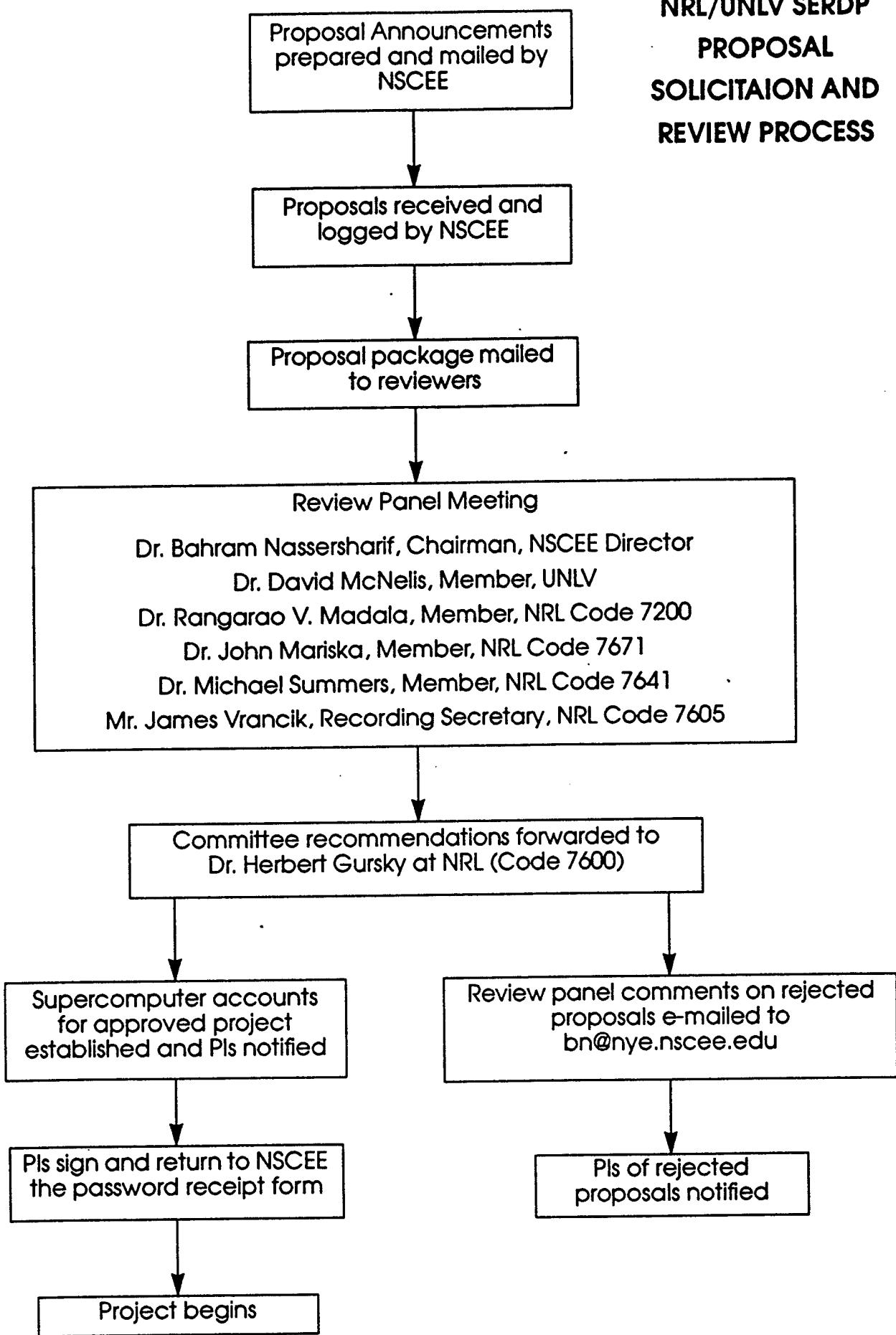
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The proposal solicitation and review process flow chart is shown on the following page. The proposal review panel consists of a chairman, four members and a recording secretary. The chairman and the four members each have one vote. The proposals are evaluated according to the following criteria:

- Scientific merit (30%).
- Qualifications of PI and institution (30%).
- Relevance to SERDP goals (30%).
- Cost/benefit (10%).

A consensus must be reached among the members of the review panel before a project can be recommended for support. The chairman of the review panel is responsible for notifying the Principal Investigators (PIs) of each proposal of the outcome of the review process. The authority for approval of the review panel's recommendations is Dr. Herbert Gursky, the Superintendent of the Space Science Division at the Naval Research Laboratory.

**NRL/UNLV SERDP
PROPOSAL
SOLICITAION AND
REVIEW PROCESS**



The NSCEE computing resources include a Cray YMP-2/216 with 16 million 64-bit words of central memory (128 megabytes), two processors, and an integrated Solid-state Storage Device (SSD) that contains 32 million 64-bit words (256 megabytes) of fast access memory. The Cray YMP-2/216 is capable of performing over 600 million 64-bit floating point operations per second. The Cray disk storage units have a total capacity of 24 gigabytes. Data migration is performed transparent to users for tape storage of aged files. NSCEE also operates a Convex C-220 and a Sun-MP690. All systems operate under the Unix operating system.

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The following sheets summarize the NSCEE systems, services, and installed software.